CMRS
Rose Allen

FACTS
Folks for Appropriate Cellular Tower Sites
P. O. Box 726, Great Barrington, MA. 01230 413/528-4271

RM 8572

Vice-President Albert Gore
The White House
Washington, DC

March 22nd, 1995

Dear Mr. Vice-President:

Thanks to Norman Hirschl's commitment to preserving this country's natural beauty and heritage, he kindly offered to convey you this letter and the enclosed material by hand.

At a time when you are fighting hard to preserve American environmental laws, we are writing you about an issue which could have a major impact on the environment and on public health. It relates to a move by the telecommunications industry to overrule state and local laws regarding the siting of cellular/ microwave towers and radiofrequency energy regulations.

Recently the CTIA (Cellular Telecommunications Industry Association) petitioned the FCC to "preempt state and local governments from enforcing zoning and other regulations which have the purpose or effect of barring or impeding commercial mobile radio service providers from locating and constructing new towers" (CTIA petition filed December 22, 1994, RM 8577).

Accompanying the petition by the CTIA is the EEA's (Electromagnetic Energy Agency) petition to preempt "state and local regulation of electromagnetic energy matters" (Amendment to ET Docket 93-62). Current IEEE/ANSI1992 guidelines (not federal standards) used by the FCC compare poorly with the far more stringent standards used in certain European countries. Promoting the ANSI1992 guidelines to standards without further research would hold negative long-term repercussions.

As a citizens' group, FACTS (Folks for Appropriate Cellular Tower Sites) advocates the siting of microwave/cellular towers in proper, non-residential sites. While we join with you in looking forward to an information superhighway, we feel caution must be used in determining the locations that would reflect communities' valid concerns for health, environmental impact and diminution of property values. "Prudent avoidance" is being proposed by scientists across the country.

While improvements must be made at the federal level, i.e. research for the development of better standards, it is our position that local and state zoning laws serve well the communities for which they were designed particularly in the siting of towers. We strongly disagree with the CTIA's statement describing local regulations as "unnecessary, disparate ... and no doubt contrary to the public interest."

On November 24, 1994, Representative Edward Markey, then Chair of the House Subcommittee on Telecommunications sent President Clinton a GAO report entitled "Status of Research on the Safety of Cellular Phones." The report

concludes that available scientific evidence is "insufficient" to determine ... risks to human health. However, according to Markey's press release on the report, "laboratory research on exposure to radio-frequency radiation has found that rats suffered learning deficits, the effectiveness of immune system cells in fighting tumors was diminished, and cancer may develop faster in the presence of other substances known to cause cancer." (Please see the enclosed including the announcement of a forthcoming book, "Electromagnetic Fields" by Blake Levitt).

Should the telecommunications industry become successful in preempting local regulations by means of the FCC, millions of residents could become exposed to extensive radio-frequency radiation from the 100,000 towers that the industry plans to construct by the year 2000. (Please see the enclosed Wall Street Jounal articles)

Thus, we urge the Clinton administration to consider two issues:

1) **Insure that existing local and state regulations in the siting of cellular/microwave towers remain respected.**

2) Advocate impartial research to establish more stringent EMF federal standards for the frequency range of cellular/microwave communication.. Based on extensive research, countries such as Poland and Russia have standards almost 300 times stricter than the 1992 ANSI guidelines for such frequencies. We hope you would agree that, in this rapidly growing industry, **Americans' health should also be protected by the safest standards in the world.**

Accordingly, is the Clinton administration taking steps to insure that radiation standards currently under consideration by the EPA meet such criteria? Who is participating in this process? What opportunity is there for public comment? What is the time schedule for the EPA review process?

Please understand that FACTS represents but one voice in opposition to the petitions before the FCC. Numerous comments have been sent to the FCC expressing opposition. The enclosed material from the NRDC (Natural Resources Defense Council), the AOPA (Aircraft Owners and Pilots Association), and the Massachusetts Office of the Attorney General testifies to this.

Thank you for your consideration in this matter.

Sincerely,

Honey Sharp Lippman, Co-Chairman FACTS; Vivian Orlowski, Steering Committee

c.c. Reed Hundt, Chairman, FCC
Carol Browner, Director, EPA
Congressman John Olver
Congressman Barney Frank
Senator Edward Kennedy
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Dr. Leon Botstein
President, Bard College
Annandale on Hudson, NY 12504-5000

March 21, 1995

Dear Dr. Botstein,

At the request of FACTS (Folks for Appropriate Cellular Tower Sites), a group concerned about the proposed construction of a cellular telecommunications tower on the Simon's Rock campus, I am forwarding a copy of a report prepared in 1991 by the Health and Safety Committee of the Ward Seven Neighborhood Association of Newton.

At that time, our city had been offered an attractive proposal to replace an aging public service communications tower with a newer, much more powerful, microwave tower with the proviso that a regional cellular phone company would have use of the new transmission facility. We did not then have an opinion as to the safety of locating microwave transmission equipment in proximity to residences. Frustrated by the dearth of reliable collections of medical data on the subject, we formed a committee of physicians and scientists to read the relevant research literature ourselves and form an opinion as to the prudence of locating a microwave tower as close to residences as the one proposed in our case. On completion of our review we recommended against the proposed project. We felt that there was sufficient evidence to raise serious concerns that microwave exposure may act at least as a "co-carcinogen," (an agent which facilitates the carcinogenic effects of other agents) if not as a carcinogen itself. We felt that there might be more risk to individuals lying motionless (e.g. in bed) for 8 hour stretches in the field of these towers than there would be to individuals merely passing through the fields (as they might in industrial or transportation-related areas). We felt that, especially since such towers are not essential for the health and safety of the community, that there was no justification for taking any risk in siting a tower. We concluded that there is sufficient evidence of possible health risk to justify a policy of "prudent avoidance."

There continue to be serious questions about the safety of microwave exposure. The National Institutes of Health, for instance, issued an RFP on the subject of health effects of electromagnetic fields, indicating that the federal government has not yet concluded they are without risk. We continue to feel that the safety of low grade microwave exposure has not been established and recommend against locating cellular towers in proximity to residences. Thank you for your attention.

Sincerely,

Sheldon Benjamin, MD
Associate Professor of Psychiatry and Neurology

cc: Honey Sharn-Lippman (FACTS)

WARD SEVEN NEIGHBORHOOD ASSOCIATION
Health and Safety Committee

Review of Health Risks Associated with Microwave/Radiofrequency Exposure

Neighbors, informed of plans to replace the existing Waban Hill radio tower with a larger more powerful facility, and sensitized by the recent publicity regarding the dangers of microwaves, are worried about the safety of themselves and their children. Skeptical of claims that there was no health risk, we formed a committee of physicians and scientists to review the scientific literature on safety of high frequency radio wave (HFRW) exposure. What we found was disconcerting. In fact, we now believe that the old installation, ignored by the neighbors for years, may also be hazardous. This document summarizes some of the unsettling information we found.

We would like to acknowledge the help of the US Environmental Protection Agency and Louis Slesin, editor of Microwave News, for providing us with a number of useful documents including a draft version of the October, 1990 EPA report, "Evaluation of the potential carcinogenicity of electromagnetic fields" (cited as EPA in this paper) and back issues of Microwave News (cited as MN is this paper). Other useful articles were found by committee members in computerized searches of the National Library of Medicine database.

Advocates of the status quo have argued that the data may not prove beyond a shadow of a doubt that HFRW at power levels in daily use are dangerous. However a judicious person reviewing the literature would have to conclude that it is highly likely such danger exists. Because radio communication cannot be eliminated, we believe a policy of "prudent avoidance" is indicated. Specifically:

Transmission should be restricted to services necessary for the public safety. (Private car phones probably are not in this category.)

Services should not be duplicated. (Newton already has adequate car phone service from Cellular One.)

Transmitting antennas should be as far from homes as possible. (Radiation decreases rapidly with distance, so even small differences matter.)

In view of the growing evidence of risk, the heightened public perception of danger, and the attendant increase in litigation, we believe it would be rash to construct new facilities that are not absolutely essential.

In the remainder of this paper we will discuss four questions:

1. What is the evidence that HFRW exposure is dangerous?

2. Are adverse health effects seen at the power levels proposed?

3. Don't government regulations protect us against excessive HFRW e:

4. Why are some people unconvinced about the danger of HFRW

What is the evidence that HFRW exposure is dangerous?

No one disputes that powerful HFRW can kill. At issue is whether HFRW produce more subtle forms of injury, at lower powers. Three convergent lines of investigation (cellular biology, animal experiments, and epidemiologic surveys) suggest that they do.

Cellular Biology Studies

Studies at the cellular level demonstrate that HFRW can induce effects that might lead to cancer, at power levels insufficient to do much heating. Research shows:

DNA can, under certain circumstances, absorb energy from HFRW (EPA p5-24).

DNA synthesis can be affected by HFRW (EPA p5-24).

HFRW can cause chromosomal abberations (most commonly breaks) (EPA p5-24).

HFRW can induce neoplastic (cancerous) transformation in cells exposed to other carcinogens which are harmless by themselves (EPA p5-39).

Modulated HFRW can interfere with the function of T-cells (cells in the immune system that, among other things, combat cancer) (EPA p5-75).

Glioma (brain tumor) cells exposed to HFRW continue to proliferate at an abnormally high rate for at least 5 days after exposure (MN X(2) ma90 p5).

HFRW enhance the ability of ara-C to damage the fetus. This effect occurs below the ANSI limit (MN VII(1) jf87 p1).

These effects have obvious implications with regard to cancer and birth defects in vivo.

Several researchers have shown that under certain conditions, modulated HFRW can increase calcium efflux from brain cells. Calcium flux across nerve cell membranes plays an important role in how brain neurons communicate with one another. The long term effect of altered calcium flow in human neurons is not yet known. Therefore, the role of this effect in producing brain tumors or neuropsychiatric changes can not be predicted. But it is worth noting that this effect occurs at exposures as low as .005 w/kg (EPA p5-46).

Animal Studies

Since it is impossible to study people under carefully controlled conditions, animal studies are the next best thing. There are at least three disturbing animal studies in the HFRW literature.

Prausnitz and Susskind[1] were among the first to address the issue of HFRW safety in animals. They exposed mice to 0.1 mw/cm^2 (or approximately[2] 0.2 w/kg) for ONLY 4.5 MINUTES per day, for 300 days. In spite of this relatively low exposure, they saw leukemia or lymphoma in over a third of the exposed, as opposed to only 10% of controls, an increase of more than three-fold. They also saw a five-fold increase in testicular atrophy with damage to sperm.

Szmigielski[3] et al investigated the ability of HFRW to accelerate the development of cancer in mice, with three separate bioassays:

By planting cancer cells and seeing if HFRW made them grow faster.

By exposing mice with a hereditary predisposition to breast cancer.

By anointing mice with chemicals known to induce skin cancer.

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[1]Prausnitz, S;Susskind, C. (1962) Effects of chronic microwave irradiation on mice. IRE Trans. on Biomed. Electron. 9:104-108.

[2]In EPA p 2-17 is a graph for converting incident power to absorbed power. Though left out of the figure, the incident power was 10 mw/cm^2.

[3]Szmigielski et al (1982) Accelerated development of spontaneous and benzopyrene-induced skin cancer in mice exposed to 2,450-M-hz microwave radiation. Bioelectromagnetics 3:179-191.

In all three cases, irradiation with HFRW substantially hastened the development of cancer.

The most recent (and expensive) study was by Guy[1]. He arranged conditions to simulate the effect on men of 450 Mhz radio waves in amounts below the ANSI limit. After only 2 years of exposure he found:

> 23.6% of the exposed developed malignancies, as opposed to 5.9% of controls.
>
> 10.4% of the exposed developed pheochromocytomas (an unusual adrenal tumor), as opposed to 1.4% of controls.
>
> 10.5% of the exposed developed glandular cancers, as opposed to 1.2% of controls.

These results speak for themselves.

The results of this study stimulated some interesting responses. An early version of the EPA study contains the sentence:

> "..., and the University of Washington study can be said to have demonstrated the carcinogenic action ..." (MN X(4) ja90 p12).

By the time copies were released to the public, it read:

> "... can be said to suggest, but not to demonstrate, a carcinogenic effect...".(EPA 4-38).

In an interview with Microwave News, Guy admitted to a sense of unease about the "unresolved issues" raised by the study. He also revealed that the Air Force (the study sponsors) has no plans for follow-up to clarify these important issues. Calls by the reporter to the Air Force project officer for the study, were not returned (MN V(2) m85 p4).

Human Studies

Of course there are no carefully controlled toxicity studies in humans. None-the-less we do have some direct evidence that HFRW are toxic to humans. First are the accidental exposures, usually to higher power levels, which come to light because of legal proceedings. These show the worst things HFRW can do. Second are the epidemiologic studies of people whose exposure, though

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[1]Results published in several volumes, 1983-1985, all entitled: Effects of long-term low-level radiofrequency radiation exposure on rats. University of Washington.

within limits previously considered safe, exceeds that of the general population. These show that HFRW cause adverse health effects at levels met in daily life. Finally there are the clusters of disease occurring around transmission facilities, where exposure is much lower. These suggest that HFRW can be a health risk at levels a lot less than was previously thought.

Accidental exposures are discussed later. Though the stories are fascinating, they hardly constitute scientific evidence. Thus we review epidemiologic evidence first.

Milham[1] determined the cause of death in almost 1700 amateur radio operators (locating cases by referring to obituaries in the magazine of the Amateur Radio Relay League). He compared this with U.S. age and race specific death frequencies for the general population. The main finding was a more than two-fold increase in deaths due to various leukemias.

He next investigated mortality among almost 68,000 men licensed as amateur radio operators by the FCC[2]. Once again he found an increased incidence of leukemia, as well as an increase in various lymphomas as well. Myeloid leukemias occurred at almost twice the expected rate.

In Honolulu, the state department of health[3] investigated cancer deaths in relation to proximity to broadcast towers. They compared cancer rates in 11 census tracts, some containing broadcast towers and others not, with rates for the state as a whole. Death rates in tracts with towers for all cancers were significantly greater than those for the state as a whole. Rates in tracts without towers were the same as those for the state as a whole. In fact, after adjusting for race, they found that residents of the tower tracts had nearly twice (1.88) the cancer of those in the tracts without towers, or those in the state as a whole (EPA 3-55).

Szmigielski[4] et al. examined cancer incidence among Polish career military personnel. They were divided into two groups based on HFRW exposure. Those exposed developed malignancies 3 times as often as the non-exposed.

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[1]Milham, S., Jr. (1985) Silent keys: Leukemia mortality in amateur radio operators. Lancet 1:812 (April 6).

[2]Milham, S., Jr. (1988) Increased mortality in amateur radio operators due to lymphatic and hematopoietic malignancies. Am. J. Epidemiol. 127(1):50-54.

[3]Environmental Epidemiology Program, State of Hawaii Department of Public Health. (1986) Cancer incidence in census tracts with broadcasting towers in Honolulu, Hawaii. Report to the City Council.

[4]Szmigielski, S., et al. (1988) Immunological and cancer-related aspects of exposure to low-level microwave and radiofrequency fields. In: Marino, A., ed Modern electricity. Marcel-Dekker, Inc.

They developed "Hematolymphatic" malignancies 7 times as often. Among the exposed, incidence of cancer correlated with the duration of exposure. Moreover cancers of any given type were seen about 10 years earlier in the exposed than among the non-exposed (MN VII(1) j87 p13).

Do adverse effects occur at the power levels proposed for the Waban Hill antenna?

A recent issue of Microwave News (MN X(5) so90 p9) lists 13 clusters of cancer (mostly leukemia and lymphoma) occurring in proximity to radio towers (or other sources of HFRW). These clusters have certain common features:

The incidence of cancer far exceeded expected numbers.

Large sources of HFRW were nearby, attracting public attention to this possible etiology for the cancers.

When measured, HFRW levels were well below the ANSI limit (and also well below the levels on Waban Hill).

No other explanation for the excess cancer was ever found.

"Authorities" rejected the notion that HFRW were at fault because the exposure was "too low". In the case of military installations, these authorities were the people producing the radiation.

Skeptics dismiss these clusters by arguing about statistics. Others, including us, are dismayed that the more people look, the more cancer clusters they find.

The University of Rochester cluster is interesting because conditions there approximate those on Waban Hill. At least 12 cases of non-Hodgkins lymphoma appeared among workers and students at the River Campus over a brief time. Five of these were among people who worked at Lattimore Hall, 100 feet from a 1000 w FM radio antenna.

Though the Waban Hill transmitter is relatively small (currently 1500 w), we are close to it. Consider, for example residents of McFarland, CA. They live only four miles from the 2-million watt transmitter of the Voice of America, yet their exposure is less than a tenth of ours. McFarland is notable for its cluster of childhood cancer.

Don't government regulations protect us against excessive radiowave exposure? What about the Courts?

The USA, unlike many other countries, has NO federal exposure limits. There is a voluntary standard, called the ANSI standard, which does not have the force of law. It was formulated by engineers, mostly associated with the department of defense[1]. This guideline was based on the notions that:

HFRW damage tissue only by heating it.

Only the total heat produced matters. The location of the heat, whether brain or buttocks, is irrelevant.

No damage is done if the absorbed power[2] is below .4w/kg.

These assumptions are now known to be incorrect[3], but powerful political forces oppose any tightening of exposure limits[4]. There have been attempts (by the EPA Office of Radiation Programs) to create a federal standard at 1/10 the ANSI limit, but these were torpedoed from within[5].

Because of the federal paralysis, several municipalities, among them Massachusetts[6], have established their own standards. Massachusetts limits

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[1]The newest incarnation of this committee is the IEEE standards board. 17 Of 31 members are associated with the department of defense, and none have biological expertise. At least one member questions the group's ability to evaluate health risks (MN X(4) ja90 p7).

[2]It is impossible to actually measure the power a person absorbs, so regulations need to translate this into some measure of field strength. At the 470Mhz police frequency, adults will absorb .4w/kg if the incident field has a strength of about 6 mw/cm^2. For children the number is $1.5mw/cm^2$.

[3]See for example the EPA conclusion (EPA p2-1), or the statement by the National Academy of Sciences (MN fm89 p14).

[4]The EPA report itself provides an example of these forces. Staffers originally classified low frequency electromagnetic fields as "probable human carcinogens", and HFRW as "possible human carcinogens". After a White House meeting these classifications were deleted from the report. An Air Force Brigadier General stated "If published, the report will .... have serious impacts on capabilities and costs of Air Force programs (MN X(6) nd90 p6).

[5]The ORP proposal was rejected because it was thought to be too expensive to implement -- i.e. too many existing installations were not in compliance (MN IV(6) ja84 p9).

[6]But if a federal standard is established that conflicts, the federal standard will apply (MA Department of Public Health 105 CMR:241-248).

exposure to 1/5 the ANSI standard. (The UK allows 1/10 and the USSR allows 1/150 of the ANSI limit.)

The courts provide additional protection. Of course one must be injured before one can claim redress. We will review several accidental exposure cases because they demonstrate the power of HFRW to do harm. Subsequent settlements hint that the defendants know what 12 reasonable people reviewing the data would conclude.

Dr. Hansson, a Swedish physician has seen about 11 radar technicians, all with at least 15 years of exposure to HFRW. They presented with neuropsychiatric symptoms, and many were unable to perform there job properly. Their symptoms might have been ascribed to "stress" or some other non-specific cause -- but for the presence of a common abnormal protein in their cerebrospinal fluid, a pattern seen among rabbits exposed to HFRW (MN V(4) m85 p11).

A pilot standing in front of an operating F-16 radar system developed severe memory loss (as well as an objective finding, a lump in his neck). "He would go shopping and would not know how to get home. He had to carry a card with his wife's telephone number to find out how to get back" (MN VIII(1) jf88 p4).

Employees and dependents at the US embassy in Moscow were bombarded by HFRW between 1953 and 1979. In comparison with personnel at other posts, they had higher frequencies of many common illnesses. In addition they reported significantly more irritability, depression, poor concentration and memory loss. All this even though recorded power levels were only .018 mw/cm^2 (EPA 3-44).

S. Yannon worked on microwave relay equipment for 15 years. At the age of 57 his eyesight, hearing, and coordination deteriorated drastically. He died at 62 having lost almost all sight, memory, speech, and motor coordination. His wife sued RCA, the manufacturers of the equipment. After skirmishing for 13 years, RCA settled for $250,000. At one point, experimental results were introduced showing that monkeys exposed to HFRW developed neurofibrillary tangles, a classic sign of Alzheimers disease (MN IX(3) mj89 p1).

Electromagnetic pulse test sites produce large exposures. Boeing employees at one such facility developed leukemias and lymphomas at 10 times the expected rate. One of them sued, blaming his leukemia on the HFRW exposure. Without admitting liability, Boeing agreed to a settlement that will be worth about $1.5 million (MN X(5) so90 p1,14).

> William Lafferty worked as a technician at an FM radio station for 22 years. He died of acute myelomonocytic leukemia at the age of 41. His widow sued the manufacturers of the radio equipment charging inadequate safeguards to protect persons in close proximity. The settlement was "substantial", but as is common in these cases, secret (MN IX(5) so89 p14).
>
> Another case that was settled secretly involved multiple myeloma in a 39 year old woman who lived 600 feet from a 50,000 w radio transmitter. This is only about three times our exposure (MN IX(5) so89 p14).

There are many more lawsuits one could cite. Clearly this is an exciting area for lawyers. One article in a magazine for lawyers refers to HFRW as "the next asbestos" (MN VII(1) jf87 p10). Some find this legal activity intimidating, among them Dr Kristian Storm, chairman of the committee that set the ANSI standard. He resigned, fearful of personal liability, because "the chairman will be the first named in a lawsuit against the committee"[1]

Why are some people unconvinced of the danger of HFRW exposure?

We have learned from recent EPA reports that common events such as living near high voltage power lines, sleeping under electric blankets, or working long hours in front of video display terminals may all result in unacceptable health risks. Our reaction, quite understandable, is to want to believe that such common exposures are safe and it is the science that is wrong.

Look how long it took to establish (and for governmental agencies and the public to accept) the relationship between smoking and lung cancer -- even though lung cancer is quite uncommon in non-smokers.

It is even more difficult to pin blame on HFRW exposure. Medical records do not identify the population at risk (doctors don't routinely ask patients if they live near microwave sources), so physicians are unlikely to correlate disease with exposure. Exposure is ubiquitous, so no proper control group exists. Moreover, the exposed get the same bad things the general population does -- only more of them. Thus it is not surprising that one has to look before the connection becomes evident.

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[1]The Navy and the IEEE, main supporters of the committee, refused to indemnify members (MN 3-4/88:14-15).

Summary

In summary, we feel that cellular biology, animal, and human studies show that MW/RF (microwave/radiofrequency) exposure presents a health risk at the power levels in the proposed antenna, and even at the power level in the existing antenna. Increased number of cancers have been found in populations exposed to less radiation then we are receiving now. We feel that state exposure limits are insufficient to protect us. Our review of the literature on MW/RF exposure has lead us to the sobering conclusion that living in close proximity to a source such as the proposed NYNEX/Newton antenna on Waban Hill will increase the risk to ourselves and our children of developing cancer.

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Nobody knows. But studies are

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By JOHN J. KELLER

DO CELLULAR telephones cause brain cancer?

For a while last year, *that* was the wireless question that everybody wanted answered. The furor has died down somewhat—but the issue hasn't gone away.

And it won't, for a simple reason: Very few studies have looked at the biological effects of cellular-frequency radio waves.

The uncertainty continues to create much concern among consumers. It also has prompted the industry to launch a three-to-five-year research effort that could cost up to $25 million. And it has threatened to become a legal nightmare for several of the largest cellular-phone makers.

The most recent lawsuit was filed in December, by Robert Kane, a Motorola Inc. engineer in Scottsdale, Ariz. Mr. Kane sued his employer in Cook County Court, Chicago, alleging that his brain cancer was caused by experiments in which he acted as a guinea pig to test a new Motorola cellular-phone antenna. Motorola, based in Schaumburg, Ill., denies the allegations.

In another high-profile case, filed in January 1993, a St. Petersburg, Fla., man sued NEC Corp. of America, a subsidiary of NEC Corp. of Japan, claiming that his wife got brain cancer from her NEC cellular phone. The case, filed in Pinellas County, Fla., circuit court, is awaiting trial. NEC has maintained that its phones are safe.

The First Response

When first confronted with the lawsuits—and the resulting publicity—the cellular industry mounted a public-relations offensive, claiming at news conferences and in news releases that there were thousands of studies going back 40 years that proved the safety of cellular phones. Since then, however, the industry has largely put forth studies that looked at the effects of radio waves *outside* the cellular frequency, or at exposure levels that are different from those experienced by cellular-phone users.

"The industry hasn't told the public the full story about how there has been very little research on biological effects at low-level exposures, similar to those of hand-held phones," says Louis Slesin, editor of Microwave News, a New York newsletter, and a frequent critic of the industry's handling of the safety issue.

Mr. Slesin and other critics also accuse the industry and its trade association, the Cellular Telecommunications Industry Association, in Washington, D.C., of exaggerating any positive research that it says supports its safety claims. (The CTIA's public-relations chief is Ron Nessen, the former White House spokesman under President Ford.)

In August, for example, an official for the Food and Drug Administration rebuked the industry and the CTIA for suggesting that enough scientific evidence exists to support the conclusion that cellular phones are safe.

Then, in December, the industry publicized research being done by Om Gandhi, chairman of the University of Utah's department of electrical engineering.

Safe Levels?

The research, outlined vaguely in a news release from the university, had found that the exposure to radiation from cellular phones is one-fourth to one-fifth of the levels considered safe by the American National Standards Institute and the Institute of Electronic & Electrical Engineers. Moreover, the press release gave the impression that its conclusion—that cellular phones are safe—had the backing of the federal government, noting that the research was financed by a division of the National Institutes of Health.

The government, however, begged to differ. In a statement, the NIH's National Institute of Environmental Health Sciences said: "Dr. Gandhi's research for NIEHS does not include studies to determine the safety of any product." It added: "No studies assessing biological effects are associated with Dr. Gandhi's grant."

Dr. Gandhi's cellular research is also being funded in part by McCaw Cellular Communications Inc., Kirkland, Wash., the nation's largest provider of cellular-phone service, which is set to merge with American Telephone & Telegraph Co.

Until the cellular-phone scare started, most of the debate over electromagnetic-field effects focused on the low-frequency radiation emitted by electric motors and high-voltage power-transmission lines. Population studies in the U.S.—and more recently in Sweden—hint that cancer, miscarriages and other ill effects are more common among people exposed to these low-frequency fields.

Now, several lab experiments indicate that radio waves that operate at high frequencies and at low power—as is the case

URNAL REPORTS. FRIDAY, FEBRUARY 11, 1994

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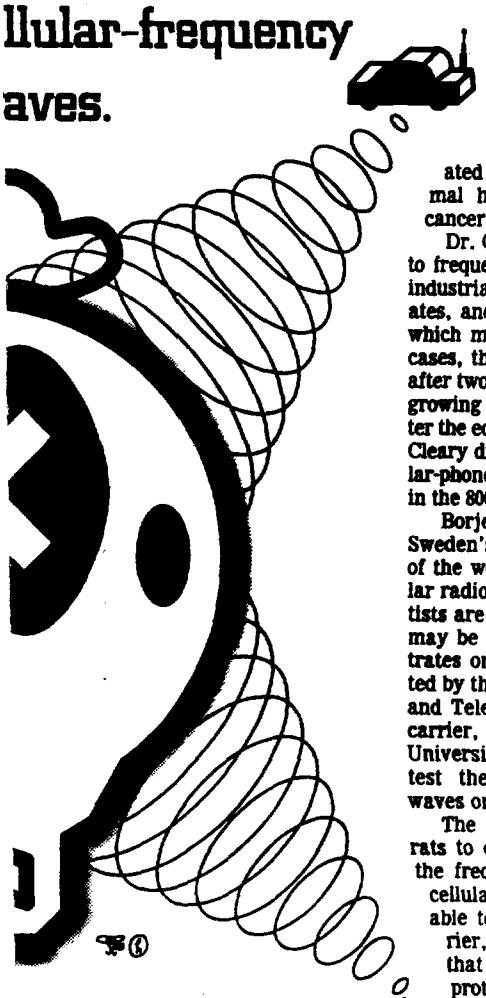
under way to determine the llular-frequency aves.



with cellular phones—can cause leakage through the blood-brain barrier, as well as cancerous cell growth and a breakdown of the calcium that coats cells and allows signals to be passed between cells.

bnormal Growth

One of those experiments was conducted by Stephen Cleary, a professor of ysics and biophysics at the Medical College of Virginia. His experiments irradiated two different types of cells—normal human lymphocytes and glioma cancer cells of the brain.

Dr. Cleary tuned his radio equipment to frequencies of 27 megahertz, at which industrial heat-sealing equipment operates, and 2.45 billion cycles a second, at which microwave ovens operate. In both cases, the cells showed abnormal growth after two hours of exposure, and were still growing abnormally three to five days after the equipment had been turned off. Dr. Cleary didn't study the effects from cellular-phone frequencies, which are typically in the 800- to 900-megahertz range.

Borje Wamblad, a radio scientist at Sweden's Telefon AB LM Ericsson, one of the world's largest suppliers of cellular radio equipment, has said that scientists are concerned that the human head may be "some sort of lens that concentrates or magnifies the radiation [emitted by the phone] to the brain." Ericsson and Televerkert Radio, the state-owned carrier, paid medical researchers at University Hospital in Lund, Sweden, to test the biophysical effects of radio waves on rats.

The Swedish scientists exposed the rats to continuous and pulsed waves in the frequency just above that used by cellular phones. The result: They were able to penetrate the blood-brain barrier, which is actually a chemical that surrounds the blood vessels and protects brain tissue from harmful toxins.

Broken-Down Binding

At the Pettis Veterans Administration Medical Center in Loma Linda, Calif., W. Ross Adey, associate chief of the research department, conducted experiments that showed radio waves at about the same power as that emitted by today's cellular phones can break down the binding of calcium to the surface of cells.

Calcium is essential for virtually all living processes, including enzyme action and cell growth, Dr. Adey says. He showed that a breakdown occurred at 145 megahertz, the frequency at which ham radios operate, and at 450 megahertz, the frequency used by security guards' radio phones. European cellular systems currently operate at 450 megahertz.

"We need to know the cumulative dose" of radio frequencies, Dr. Adey says.

Still under way are tests announced in December by the industry-backed group, including a large-scale epidemiological study to assess the impact of exposure to radio-frequency waves, specifically on portable cellular-phone users. It is being directed by Kenneth Roghman and Nancy Dreyer of Epidemiology Resources Inc., a research outfit in Newton Lower Falls, Mass.

The industry has also asked for proposals on studies that will examine possible genetic effects of exposure to cellular-phone frequencies.

Peer Review

Peer review of all of the industry-backed studies will be coordinated through Harvard University's Center for Risk Analysis, says George L. Carlo, an epidemiologist at Georgetown University in Washington, D.C., and chairman of the group.

Although critics question the credibility of studies financed by an industry whose principal product is being scrutinized, Dr. Carlo insists that they will be impartial.

"We have actively sought the input of scientists from academia, industry, government and the private sector who are experienced in this area of research," he says.

Meanwhile, the cellular-phone boom is intensifying concerns about the industrie's high-powered transmission towers. Pressure is mounting on politicians from communities across the country to restrict the installation of cellular-phone-transmission towers, especially near schoolyards and homes.

The debate will get more heated, thanks to personal communications services, the next generation of wireless technology, which call for the construction of tens of thousands of transmission units—anywhere people stroll or need to use a phone.

Complains Mr. Slesin, the newsletter-writer: "The phone industry is talking about starting a new kind of portable-phone service, installing yet another source of radio-frequency emissions, without settling the health issue adequately." ■

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MARKEY RELEASES GAO REPORT ON CELLULAR PHONES
SCIENTIFIC EVIDENCE INSUFFICIENT TO DETERMINE HEALTH RISKS

Washington, D.C. -- Congressman Edward J. Markey (D-MA) today released a report he requested from the General Accounting Office (GAO), which concluded that available scientific evidence is "insufficient" to determine whether portable cellular phones present risks to human health. More than 16 million persons in the U.S. currently use cellular telephones--about a third of which are hand-held portable cellular phones--and the industry estimates that by the year 2000 over 60 million people will be using a portable cellular communications device.

GAO found that the telecommunications industry is funding research that should improve scientific knowledge, but recommended that federal agencies interact with the industry to insure that the research is objective, useful, and independent of bias. In releasing the report, Markey commented, "There is no reason for panic, but the bad news is that no one can definitively conclude that health risks from portable cellular phones are negligible. Millions of citizens need to know whether they are being exposed to a health risk when using their portable phones."

As Chairman of the House Subcommittee on Telecommunications and Finance, Markey requested in January 1993 that GAO evaluate the status of scientific knowledge on the biological effects of radio-frequency radiation emitted by portable cellular phones, and the federal government's action to address the safety of these phones. GAO concluded that neither government nor industry has completed studies to determine if portable cellular phone use poses human health risks. Laboratory research on exposure to radio-frequency radiation has found that rats suffered learning deficits, the effectiveness of immune system cells in fighting tumors was diminished, and cancer may develop faster in the presence of other substances known to cause cancer. (GAO Report, pp. 15, 16).

GAO also found that federal agencies with research or regulatory responsibilities related to cellular phones have been hampered by resource limitations and other priorities. The telecommunications industry is planning both epidemiological and laboratory studies to provide needed answers, but federal agencies need to be assured that the research is objective if they use results for regulatory decisions.

Markey also wrote to President Clinton urging coordination of federal research agencies in order to answer the questions raised by GAO.

The subject of the GAO report was portable cellular phones, because their antennae are very close to a person's head when the phone is in use. This is not the case with automobile phones, transportable telephones carried in a briefcase, or cordless phones in homes. The Food and Drug Administration also has advised that consumers concerned about avoiding even potential risks should use conventional phones for lengthy conversations, limiting portable cellular phone use to shorter conversations.

The GAO Report, "Status of Research on the Safety of Cellular Telephones," (RCED-95-32), and Markey's letter to President Clinton, are available from the Subcommittee.